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L5: Entry 10 of 14 File: USPT May 4, 1993

DOCUMENT-IDENTIFIER: US 5207504 A
TITLE: Method and apparatus for tuning strip flourescent light fixtures

ABPL:
A tunable high intensity lighting system comprising at least a light enclosure box, an elongated shaped reflector, and a lens. The high intensity lighting system can be retrofitted to existing strip fluorescent light fixtures to adapt the existing fixture to obtain desired lighting characteristics for a specific application. By using different combinations of components, different light intensities, and tint and glare characteristics are obtained. A method for tuning existing strip fluorescent light fixtures also is disclosed, as is a kit for preselected applications, where the kit contains the components for the retrofitting to the existing fixture.

BSPR:
This invention relates to a method and apparatus for tuning strip fluorescent light fixtures to increase the intensity, while improving the tint and glare characteristics of existing strip fluorescent light fixtures for specific applications. More particularly, this invention relates to a tunable high intensity lighting system which may be retrofitted by attaching to the existing strip fluorescent housing a light enclosure box with fluorescent tube sockets, which encloses and contains an elongated shaped reflector, tubes, and a lens which fits at the bottom of the light enclosure box.

BSPR:
The present invention achieves these and other objectives which will become apparent from the description that follows, by providing a high intensity lighting system which includes at least a light enclosure box, an elongated shaped reflector, and a lens. The light enclosure box has sides, a top and an open bottom. The light enclosure box is attachable to an existing strip fluorescent housing by an attachment system. The elongated shaped reflector fits within the light enclosure box, and is curved downward toward the bottom of the enclosed box. High output fluorescent tubes fit within the shaped reflector and are plugged into strip fluorescent sockets inside the top of the light enclosure box. Attached to the enclosure light box bottom is the lens. In this embodiment, the elongated shaped reflector, tubes, and lens can all be interchanged to adjust the light intensity, tint, and glare characteristics to achieve a desired lighting effect for a particular application.

BSPR:
An alternative preferred embodiment constructed in accordance with the present invention provides a kit for tuning strip fluorescent light fixtures which includes at least a light enclosure box, an elongated shaped reflector, and a lens. In this embodiment, the kit is packaged as a unit to be retrofitted for specific applications where the correct combination of components to achieve the desired lighting has been predetermined.

BSPR:
Another alternative preferred embodiment in accordance with the present invention provides a method for tuning existing strip fluorescent light fixtures for particular applications is provided. In the method of this preferred embodiment, the combination of high output ballast, light enclosure box, elongated shaped reflector, fluorescent light sockets, high output fluorescent light tubes, and lens is determined that will result in the emitted light with the desired characteristics. After the correct components have been determined, they are installed on the existing strip fluorescent

housing as needed.

BSPR:
In this method of alternative preferred embodiment, the installation of the selected components can include the steps of removing the ballast, reflector, sockets, and tubes from the existing strip fluorescent light fixture, leaving the existing strip fluorescent housing in place. A high output ballast can be placed within the existing strip fluorescent housing, if needed. Then, the light enclosure box with the shaped reflector is attached to the existing strip fluorescent housing. After the light enclosure box is attached, the high output fluorescent tubes are plugged into the fluorescent light sockets and the desired lens is attached to and substantially covers the bottom of the light enclosure box.

BSPR:
A further alternative preferred embodiment in accordance with the present invention uses a shaped reflector can be tinted to change both the intensity and the tint of the lighting emitted by the fixture.

BSPR:
An additional alternative preferred embodiment in accordance with the present invention uses the curved elongated reflector is divided laterally so that a first section of it is tinted and a second section is tinted differently or not at all, thereby allowing light with two different characteristics to be emitted from a single fixture. This enables a single fixture to provide lighting for work areas requiring two different types of lighting. Also, in this alternative preferred embodiment, the lens can be divided into two sections that correspond substantially to the first and second sections of the elongated shaped reflector. The use of different lenses can further enhance the tuning of light for two different work stations.

DRPR:
FIG. 5A is partial perspective view of a preferred of an elongated shaped reflector constructed in accordance with the present invention.

DRPR:
FIG. 5B is a partial perspective view of a second preferred embodiment of an elongated shaped reflector constructed in accordance with the present invention.

DRPR:
FIG. 5C is a partial perspective view of a third preferred embodiment of an elongated shaped reflector constructed in accordance with the present invention.

DEPR:
With reference to FIG. 1 a high intensity lighting system 20 is shown. The high intensity lighting system has a light enclosure box 22 with sides 24 a top 26 and a substantially open bottom 28. The light enclosure box is a hollow, substantially enclosed box with the exception of its substantially open bottom. Fitting within the light enclosure box is an elongated shaped reflector 30. Along its length, the elongated shaped reflector is substantially straight while laterally it has a shape that opens downward. This lateral shape is substantially uniform for the length of the elongated shaped reflector. The elongated shaped reflector has an inner surface 34 which reflects light from inside the light enclosure box. Two high output fluorescent tubes 36 fit within the inner surface of the elongated shaped reflector. Attached to and substantially covering the substantially open bottom is a lens 38.

DEPR:
The high intensity lighting system 20 is retrofitted to an existing strip fluorescent light fixture 40, as shown in FIG. 3. After the existing fluorescent tubes 42, and reflector 44 are removed from the existing strip fluorescent light fixture, a strip fluorescent housing 46 is left. The ballast (not shown) may or may not be removed. It is this component that is wired into the ceiling, wall, etc., in the commercial and industrial application.

DEPR:

After the light enclosure box 22 has been attached to the strip fluorescent housing 46, the elongated shaped reflector 30 is installed within the light enclosure box. The elongated shaped reflector is slightly shorter than the length of the light enclosure box, and is short enough to fit between the fluorescent light sockets 52 which are located proximate the ends of the strip fluorescent housing in corresponding pairs. The elongated shaped reflector can be attached to the light enclosure box by a variety of means of mechanical devices, including screws 60 that are shown.

DEPR:
Both the light enclosure box 22 and the elongated shaped reflector 30 can be made from any number of materials which provides sufficient structural strength, and at the same time, are lightweight to function correctly and fabricate economically. Common sheet steel has been used with success and it is anticipated that other metals such as aluminum could be used with equal success. Some plastic materials which can be fabricated with high rigidity and which are reasonably temperature resistant also could be used in the fabrication of the light enclosure box and the elongated shaped reflector.

DEPR:
Since industrial or commercial situations do typically use high output or even very high output strip fluorescent light fixtures, the high intensity lighting system 20 does not necessarily include a replacement ballast 48 or fluorescent light sockets 52, although it can. In other applications, the high intensity lighting system can be retrofitted to a standard strip fluorescent light fixture to improve the intensity, tint, and glare characteristics of the standard fixtures also. Even if the standard ballast is not replaced with a high output ballast, the use of the light enclosure box 22, the elongated shaped reflector 30, and lens 38 can cause dramatic improvements and allow tuning of the standard strip fluorescent light fixture. Even greater improvements can be obtained by retrofitting a high output ballast 48 in the existing strip fluorescent housing 46 of the standard strip fluorescent light fixture, but such an adaptation requires that fluorescent light sockets 52 for high output fluorescent light tubes 36 also be fitted to the fluorescent light housing of the standard strip fluorescent light fixture. The high intensity lighting system 20 also may be adapted to existing low output strip fluorescent light fixtures, which use a ballast of approximately 260 milliamps.

DEPR:
A high intensity lighting system 20 constructed in accordance with the present invention allows a user to adjust the light emitted by the fixture to obtain the desired characteristics of intensity, tint, and glare by changing both the elongated shaped reflector 30 and lens 38 either separately or together. Another characteristic that is adjusted during the retrofitting of the high intensity lighting system is the size of the area affected by the light from the retrofitted strip fluorescent light fixture. This characteristic is closely related to the light intensity of the fixture. Different combinations of components directly affect the size of the work area that is illuminated by the fixture. Different lens 38 and elongated shaped reflectors 30 can either expand or shrink the area illuminated by the fixture.

DEPR:
FIG. 5A-5C illustrate just some of the configurations of the lateral shapes available in the elongated shaped reflectors 30a, 30b, and 30c for use with the present invention, although these examples are in no way exhaustive. In addition to the variations in shape configuration of the elongated shaped reflector, the finishes of the inner surfaces 34a, 34b, and 34c also effect the intensity, tint, and glare characteristics of the light emitted by the light fixture. Specular, or highly reflective, finishes are desired when higher intensity light is desired. Also the inner surface can be tinted with a colored, translucent film to change the tint of the light emitted from the high output strip fluorescent light fixture while retaining high reflectivity. Also, the inner surface can be painted which can reduce the intensity of the light emitted as well as effecting the tint of the light emitted. The shape configurations of the elongated shaped reflector specifically affect the size of the area illuminated by a fixture retrofitted with the high intensity lighting system 20.

DEPR:
In addition to the size and shape of the apertures, the lens affects the characteristics of the light emitted from the light fixture and the shape and finish of the lens walls 68a, 68b, and 68c, which also form the portion of the lens connecting the apertures. The lenses illustrated in FIGS. 6A-6C have lens walls that are curved inward towards the apertures 66a, 66b, and 66c at the top 70a, 70b, and 70c of the lens. The lens walls have a highly reflective finish, such as a mirrored finish. Thus, the lens acts as a reflector also. The shape of the lens walls correspond to the portions of a parabolic curve. These features of a lens are shown in detail in FIG. 7 which is an enlarged portion of lens 38a. Many types of lenses are already commercially available. Success has been achieved using a Para-Lite III lens from A.L.P. Lighting and Ceiling Products, Inc. The lenses themselves can be made from any number of materials. Success has been achieved using high impact plastics. While the apertures shown in the drawings are substantially square or rectangular, they are available in other shapes such as circular or oval which can be used as is appropriate.

DEPR:
The only limitations on the curved configurations of the elongated shaped reflectors 30 or lens apertures 66 are those of the human imagination combined with the practical limitations of size and usefulness. By using different combinations of lenses 38 and reflectors the light emitted from the light fixture can be "tuned" to a specific application.

DEPR:
Example of an application where intensity, tint, and glare characteristics of lighting is critical are fruit sorting lines. Fruit is passed along sorting lines where sorters grade the fruit according to its quality. Since the grade of the fruit affects the price which will be paid for the fruit it is a critical determination. The fact that fruit varies in color, texture, and reflectivity makes it very difficult to sort more than one kind of fruit in a single area with a single type of lighting source. By using the present invention, a single sorting line could be used to sort a variety of fruits where the user would simply change the reflectors and lenses to obtain the correct tint, light intensity, and glare characteristic to enable sorters to sort a specific fruit. When a particular season ended, the elongated shaped reflectors and lenses could be changed for the next seasonal produce to be sorted.

DEPR:
At the site of the experimental installation, the existing strip fluorescent light fixture's light intensity at a work station was 70 to 150 foot candles, depending on the height of the light fixture. The output using a high intensity light system 20 with an elongated shaped reflector 22a as shown in FIG. 5A and a lens 38b as shown in FIG. 6B, is 270 to 325 foot candles at the work station with the light fixture 37 inches above the work station. Thus, the intensity of the light is improved dramatically while workers reported reduced eye strain and an accompanying improvement in the ability to perform the work.

DEPR:
While high output strip fluorescent light fixtures are presently being used, they are an open configuration with only a reflector 44 and tubes 40 as shown in FIG. 3. While there are existing enclosed high output strip fluorescent light fixtures, they have to be water cooled to enable them to function correctly. Thus, a user who wishes to go to an enclosed high output strip fluorescent light fixture is forced to remove the existing fixtures completely and to install water cooled fixtures with all of the added expense, complications, and reduced reliability incumbent in such a system. The water cooling aspect of existing enclosed high output fluorescent light fixtures is required due to the heat generated by such fixtures.

DEPR:
In addition to using the elongated shaped reflectors with different configurations, tint, or paint on the curve inner surface, another device which may be used to affect tint and intensity of the light is a translucent screen used in conjunction with an existing lens. As shown in FIG. 8, one way to use the translucent screen 78 is to simply lay it on top of the lens 79

within the light enclosure box 80. This may be desirable in applications where the work surface or items to be examined are highly reflective and tend toward glare.

DEPR:
Another embodiment of the present invention makes even fuller use of the adaptive properties of the high output strip fluorescent light fixture constructed in accordance with the present invention as shown in FIG. 9. In this embodiment, of the elongated shaped reflector 82 has a first inner surface 84 and a second inner surface 86. The first inner surface 84 has a specular finish for high intensity lighting while second inner surface 86 may be painted to allow a work station where reading is required. This adaptability can also extend to the lens 88 which can have a first plurality of apertures 90 and a second plurality of apertures 92. An example of the use for such an embodiment would be where a fixture overlaps a sorting line and an area where reports must to be filled out. With this configuration, a single strip fluorescent light fixture can provide high intensity lighting for the sorting procedure while providing lower intensity lighting for the report writing work station. A variation of this embodiment would have an elongated shaped reflector with a single curved configuration but with the two portions illuminated by different finishes on the curved inner surface.

DEPR:
In practice, the first step for utilizing an embodiment of the present invention would be to evaluate the lighting in the affected area and determine the desired characteristics for lighting in the area to optimize working conditions. After these determinations have been made, the appropriate combination of high output ballast 48, light enclosure box 22, elongated shaped reflector 30, fluorescent light sockets 52, high output fluorescent light tubes 36, and lens 38 can be selected for installation.

DEPR:
As information on the appropriate combination of components for specific applications is gathered, data bases or "look up" tables can be created as reference guides which will enable a quick, efficient selection of the correct components for specific applications. An outgrowth of these data bases or tables is the ability to set up kits containing preselected components to enable the tuning of existing strip fluorescent light fixtures to specific applications without the need for individualized evaluations or experimentation for installation of a high output strip fluorescent light fixture in accordance with the present invention. These kits have at least a light enclosure box 22, an elongated shaped reflector 30, and a lens 38. The kits could also include a high output ballast 48, or fluorescent light sockets 52, or high output fluorescent light tubes 36, the number of components in the package would be dependent upon the extent to which components from the existing strip fluorescent light fixture could be used. Similarly, kits for tuning strip fluorescent light fixtures which have already been retrofitted with the high intensity lighting system 20 could be created using primarily just elongated shaped reflectors and lenses, since such a light fixture would already have the light enclosure box and very probably would have the correct ballast, fluorescent light sockets, and tubes. The variation on such kits is limited only by the variations on the applications and the desired tuning.

CLPR:
1. A method for tuning an existing strip fluorescent light fixture, with said existing strip fluorescent light fixture having a strip fluorescent housing, a ballast, a reflector, at least two fluorescent light sockets, and at least one fluorescent light tube, to obtain lighting with desired characteristics in a specific area, wherein said tuning method comprises the steps of:

CLPR:
6. A kit for tuning an existing strip fluorescent light fixture to obtain lighting with desired characteristics in a specific area, said existing strip fluorescent light fixture having a strip fluorescent housing, a ballast, a reflector, at least two fluorescent light sockets, and at least one fluorescent light tube, said kit containing a combination of preselected components wherein said kit comprise:

CLPR:

9. A high intensity lighting system, said high intensity lighting system to be retrofit to an existing strip fluorescent light fixture, said existing strip fluorescent light fixture having a strip fluorescent housing, a ballast, a reflector, at least two fluorescent light sockets, and at least one fluorescent light tube, wherein said high intensity lighting system comprises:

CLPV:
determining a combination of a high output ballast, a light enclosure box, an elongated shaped reflector, high output fluorescent light tube, and a lens for achieving said desired lighting characteristics;

CLPV:
removing all said fluorescent light tubes and said reflector from said existing strip fluorescent light fixture, leaving said strip fluorescent housing;

CLPV:
installing said elongated shaped reflector within said light enclosure box;

CLPV:
plugging at least one said high output fluorescent light tube into said strip fluorescent housing inside said light enclosure box below said elongated shaped reflector; and

CLPV:
an elongated shaped reflector, said elongated shaped reflector having a length and a width, and said elongated shaped reflector fitting within and being attachable to said light enclosure box; and

CLPV:
a reference guide, said reference guide containing data that determines which said light enclosure box, said elongated shaped reflector, and said lens will result in said desired lighting characteristics.

CLPV:
an elongated shaped reflector, said elongated shaped reflector having a length and a width, and said elongated shaped reflector fitting within and being attachable to said light enclosure box; and

CCOR:
362/260

CCXR:
362/147

CCXR:
362/217

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L5: Entry 4 of 14 File: USPT Sep 14, 1999

DOCUMENT-IDENTIFIER: US 5951151 A
TITLE: Lamp assembly for a recessed ceiling fixture

ABPL:
A lamp assembly for a recessed ceiling fixture includes a support, a lens retainer removably mounted to the support and carrying a lens, a heat shield removably mounted on the lens retainer above the lens, an electric socket supported by an upper end of the heat shield, and a lamp disposed within and supported by the heat shield and electrically coupled to the socket. The lamp includes a reflecting surface that reflects visible light forwardly and transmits heat rearwardly toward a dome shaped reflector surface of the heat shield which reflects that heat forwardly. The heat shield, lamp, and socket can be removed as a unit from the lens retainer in order to be able to replace the lamp while leaving the lens in place. When re-mounting the unit, the lamp engages centering surfaces carried by the lens retainer to center the lamp relative to the lens.

BSPR:
A predominate light source within the lighting industry is the low voltage MR16 dichroic lamp. That compact light source provides crisp white light with pin point control in a two-inch lamp diameter. This lamp is available as a cool beam lamp, the glass structure being coated with a dichroic reflective coating. That coating allows about 60% of the radiant heat to transmit rearwardly through the reflector surface, while reflecting nearly 99% of the visible light forwardly. However, the additional heat emitted towards the rear of the lamp results in various manufacturing concerns, such as:

BSPR:
2) The emission of visible light rearwardly along with the heat from the dichroic reflector. That allows end users to see into the recessed housing and is aesthetically unacceptable.

BSPR:
It is known from Kim U.S. Pat. No. 3,769,503 and David U.S. Pat. No. 5,130,913 to provide a heat-reflective surface behind a dichroic lamp to reflect the heat forwardly. In particular, each of those patents discloses the provision of a metallic cup-shaped heat reflector spaced behind a dichroic lamp which acts on heat radiation that has passed rearwardly through the reflector surface of the lamp to reflect that radiation forwardly.

BSPR:
In the Kim fixture, the heat reflector is pivotally supported on an axle to rotate about the dichroic lamp. In the David fixture, the heat reflector is supported by the lamp or by the socket in which the lamp is coupled, but there is no disclosure of how the lamp and socket themselves would be supported.

BSPR:
When employing a heat reflector in combination with a dichroic lamp, there are serious concerns involving the mounting of the components which are not addressed by either of the Kim and David patents. That is, it is necessary to achieve a proper orientation of the lamp to ensure that the light is directed as intended, and also to prevent the glass lamp from contacting the hot reflector. This must be achieved while maintaining a proper alignment between the metallic heat reflector and the lamp to ensure that the heat is reflected by the metallic element in an optimum direction with respect to the lamp. This means that a reliable amount of positional control must be exerted upon both

the lamp and the heat reflector. However, such control should not result in excessive pressure being applied to the lamp, which could cause damage to the lamp.

BSPR:
The present invention relates to a lamp assembly comprising a support, a heat shield, an electrical socket, and a lamp. The support includes an aperture extending therethrough. The heat shield includes a dome-shaped portion, and a mounting structure for removably mounting the heat shield to the support. The dome-shaped portion includes an interior heat reflecting surface facing in a forward direction. The electrical socket is disposed on a rear wall of the heat shield and is supported thereby. A lamp is disposed within the dome-shaped portion and is electrically connected to the socket so as to be supported by the heat shield. The lamp includes a forwardly facing reflecting surface capable of reflecting visible light forwardly while allowing radiant heat to pass rearwardly therethrough toward the heat reflecting surface of the dome-shaped portion.

BSPR:
Another aspect of the present invention relates to a recessed lighting fixture for a ceiling, the fixture comprising a lamp, a reflector disposed below the lamp, and a trim ring having an annular shoulder upon which a radially outwardly projecting flange of the reflector rests. The trim ring includes an annular, radially inwardly facing surface extending downwardly from a radially inward edge of the shoulder. The improvement involves the reflector including an annular bead projecting downwardly from a radially inner end of the flange to cover the surface. Preferably, the inwardly facing surface is beveled such that an upper end thereof is situated radially outwardly with respect to a lower end thereof.

DRPR:
FIG. 7 is a fragmentary vertical sectional view through one side of a trim plate of the fixture depicted in FIG. 6, and a fragmentary vertical sectional view through a reflector supported on the trim plate; and

DRPR:
FIG. 9 is an exploded perspective view of a reflector and trim ring according to the present invention.

DEPR:
The lamp 112 is a low voltage MR16 lamp which, as described earlier, possesses a forwardly facing surface 113 coated with a dichroic reflective coating which allows about 60% of the radiant heat to transmit rearwardly therethrough, while reflecting nearly 99% of the visible light forwardly.

DEPR:
A downwardly or forwardly facing surface 115 of the dome-shaped portion 82 constitutes a heat reflecting surface. The heat shield 80 can be formed of metal, such as unpolished aluminum which is deep drawn to the final shape and then anodized, top coated, or painted. Alternatively, the heat shield could be formed of ceramic or a high temperature resistant plastic. The reflectance characteristic of the surface can run the range from a specular finish to a lambertion (diffuse) finish.

DEPR:
Fixedly attached to the rotary ring is a reflector 152 which has a radially outwardly extending annular flange 153 resting slidably on a radially extending annular shoulder 154 of a trim ring 156, i.e., on a first surface 172 of that shoulder 154 which faces toward the hole 170. The shoulder includes a second surface 174 facing away from the hole 170 and lying in a plane P. The trim ring 156 includes a hole 176 extending along the axis L. The trim ring 156 is attached to the plaster frame 132 by conventional torsion springs 157 (see FIG. 9). The reflector 152 includes an inclined aperture 158 at its upper end which accommodates the angular positioning of the adjustment arm 12 about an axis defined by the pivot pins 128. The reflector 152 includes another aperture 159 at its lower end, the apertures 158 and 159 spaced apart along the axis L. A tab 151 (FIG. 9) formed on the flange 153 projects radially into a slot 151A formed in a vertical cylindrical wall 161 of the trim ring 156, in order to properly angularly orient the reflector 152

relative to the trim ring 156. Spring clips 155 retain the reflector in place on the trim ring. The spring clips are removable to permit the reflector to be removed, e.g., to be painted.

DEPR:
A prior art trim ring 156A and reflector 152A depicted in FIG. 8 also includes a shoulder 154A on the trim ring 156A, and a radial flange 153A of the reflector resting on the shoulder. The trim ring 156A also includes a radially inwardly facing annular third surface 160A extending downwardly from a radially inner end of the first surface 172, which surface 160A is exposed to light rays within the reflector. Thus, a light ray 162 from the lamp can reflect off that surface 160A (which does not possess a reflective finish) to create an aesthetically unpleasant appearance to a viewer looking up from below.

DEPR:
The present invention avoids that shortcoming, because the reflector 152 includes an annular bead or ridge 164 extending downwardly toward the plane P from a radially inner end of the flange 153. That bead covers the radially inwardly facing surface 160, thereby preventing that surface 160 from reflecting light rays. Rather, the light is reflected by the reflective surface of the reflector as shown in FIG. 7.

DEPR:
During use, the lamp 112 reflects 99% of the visible light and 40% of the radiant heat forwardly, and transmits 60% of the radiant heat and 1% of the visible light rearwardly. The rearwardly transmitted heat and light energy engages the reflective surface of the heat shield 80 and is reflected forwardly. This energy is reflected out from behind the lamp in two ways: 1) re-transmitting through the dichroic reflector or 2) reflecting around the perimeter of the lamp. Passing light around the exterior of the lamp is preferred so that the components of the lamp, such as the pinch seal, do not receive any increase in thermal load. A variety of general contours of the reflective surface of the heat shield can be designed to achieve these results. For instance that reflective surface can have a parabolic contour, however any conic section (linear, circular, parabolic, elliptical, hyperbolic) or derived contour (involute, macro-focal conic) may be used depending on the physical constraints of the recessed housing.

DEPR:
By reflecting the heat forwardly, the components disposed behind the lamp are not overheated. By reflecting the visible light forwardly, the area behind the lamp does not become illuminated so as to create an unpleasant appearance to a viewer.

DEPR:
The heat shield is automatically positioned in a specific location relative to the lens retainer plate 24, by the engagement of the notches 88 in the tabs 38, and by the engagement of the notch 90 with the relamping spring 42. Also, the lamp 112 is automatically centered by the lens retainer springs 34 when the heat shield is installed. Thus, the reflective surfaces of the heat shield and lamp are properly aligned with respect to the apertures 26, 18 and lenses 70, 72 and with respect to one another. Further, there is no risk that the side of a hot heat shield can contact the lamp.

CLPR:
12. In a recessed lighting fixture for a ceiling, comprising a frame having a first hole extending therethrough, the first hole defining a longitudinal axis; a trim ring mounted to the frame; the trim ring having a second hole extending therethrough along the longitudinal axis; the trim ring further having an annular shoulder surrounding the second hole; the annular shoulder including a first surface facing toward the first hole, and a second surface facing away from the first hole, the second surface lying in a plane; the first surface including a radially inner edge; a reflector including a wall having first and second apertures spaced apart along the longitudinal axis, the reflector including a flange extending radially outwardly with respect to the longitudinal axis; the flange engaging and resting on the first surface; the trim ring including an annular third surface extending from the radially inner edge of the fist surface in a direction toward the second surface; the

third surface facing generally radially inwardly toward the longitudinal axis; the improvement wherein the reflector includes an annular bead extending from a radially inner edge of the flange in a direction toward the plane of the second surface and covering the third surface.

CLPV:
a heat shield removably mounted to the support and including a dome-shaped portion, the dome-shaped portion including an interior heat-reflecting surface facing in a downward direction toward the aperture;

CLPV:
a lamp disposed within the dome-shaped portion and electrically connected to the socket and supported directly by the heat shield, the lamp including a downwardly facing reflecting surface defining means for reflecting visible light downwardly while allowing radiant heat to pass upwardly therethrough toward the heat-reflecting surface of the dome-shaped portion.

CLPV:
a heat shield removably supported by the lens retainer and including a dome-shaped portion having an interior heat-reflecting surface facing in a downward direction toward the lens retainer;

CLPV:
a lamp disposed within the dome-shaped portion and electrically connected to the socket so as to be supported by the heat shield; the lamp disposed between the heat shield and the aperture and including a downwardly facing reflecting means for reflecting visible light downwardly and while allowing radiant heat to pass upwardly therethrough toward the heat-reflecting surface of the dome-shaped portion;

CLPV:
a heat shield including a dome-shaped portion having an interior heat-reflecting surface, the heat shield being removably mounted on the lens retainer such that the heat-reflecting surface faces downwardly toward the aperture;

CLPV:
a lamp disposed within the dome-shaped portion and electrically connected to the socket so as to be supported directly by the heat shield, the lamp disposed between the heat shield and the aperture and including a downwardly facing reflecting means for reflecting visible light downwardly and allowing radiant heat to pass upwardly therethrough toward the heat-reflecting surface of the dome-shaped portion;

CCOR:
362/365

CCXR:
362/294

CCXR:
362/364

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L6: Entry 5 of 15 File: USPT Oct 4, 1994

DOCUMENT-IDENTIFIER: US 5353210 A
TITLE: Reflector lamp with low UV emission

DEPR:
Coatings and materials which absorb UV radiation, but which transmit visible light radiation are also known to those skilled in the art and in the practice of the present invention may include those commercially available and obtained from coating manufacturers and suppliers such as the Silicone Division (GE Silicones) of GE Plastics in Waterford, N.Y., Dow Corning, DuPont, Bee Chemical Company and the like. Heat-resistant coatings are preferred for use in the present invention, and illustrative but non-limiting examples of both coatings and UV absorbers based on heat-resistant silicone compounds suitable for use in the present invention are disclosed and claimed, for example in U.S. Pat. Nos. 4,374,674; 4,278,804; 3,986,997; etc., the disclosures of which are incorporated herein by reference. Another UV-absorbent coating material suitable for use in the present invention is zinc oxide (ZnO) and is disclosed in U.S. Pat. No. 4,006,378, the disclosures of which are also incorporated herein by reference. Zinc oxide may also be employed as a pigment material in an ordinary coating or in a higher temperature resistant silicone coating alone, or combined with titanium dioxide, depending upon the application. Such a coating material is disclosed in U.S. Pat. No. 5,051,650, the disclosure of which is incorporated herein by reference. In yet another embodiment, the visible light reflecting coating or film applied to the outer surface of the reflector may be a coating which, in addition to reflecting visible light, also inherently absorbs UV radiation, such as some types (i.e., titania-silica and tantala-silica) of multi-layer, optical interference coatings.

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L6: Entry 10 of 15 File: USPT Jun 13, 1989

DOCUMENT-IDENTIFIER: US 4838629 A
TITLE: Reflector

DEPR:
In the illumination apparatus, infrared rays transmitted through multilayered optical film 5 are not absorbed by body 4 upon transmission therethrough. When a high-output discharging lamp is used as light source 1, as described above, body 4 can be prevented from being degraded by heat. More specifically, the polyimide-based resin and the polyether ketone-based resin have a relatively high transmittance of light components in the infrared wavelength range. Therefore, reflector body 4 is formed of these resin materials, infrared absorption in the body can be suppressed, and a temperature rise of the body can be prevented. If the thickness of body 4 is increased, an absorbance upon transmission of infrared rays is inevitably increased. FIG. 13 shows the characteristics. However, if the thickness of body 4 is decreased, the infrared absorbance is decreased, and the temperature of body 4 can be decreased. The above-mentioned synthetic resin materials have high heat resistance, and are advantageous from this point of view. Conditions in that the temperature of body 4 does not exceed a heat-resistant temperature of the material were examined in consideration of the relationship between an output of a light source and an area of a reflector in a conventionally designed illumination apparatus. As a result, it was found that if the thickness of body was 300 .mu.m or less, the temperature of body 4 became lower than the heat-resistant temperature of the synthetic resin material. However, if body 4 has a very small thickness, the mechanical strength becomes insufficient, and in particular, precision of the reflection surface is degraded. In practical applications, the thickness can be 50 .mu.m or more to obtain a sufficient mechanical strength and satisfactory precision of the reflection surface.

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L6: Entry 10 of 15 File: USPT Jun 13, 1989

US-PAT-NO: 4838629
DOCUMENT-IDENTIFIER: US 4838629 A

TITLE: Reflector

DATE-ISSUED: June 13, 1989

INT-CL: [4] G02B 5/28
US-CL-ISSUED: 350/1.6; 350/1.1
US-CL-CURRENT: 359/359
FIELD-OF-SEARCH: 350/1.6, 350/1.1

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L1: Entry 11 of 18 File: USPT Dec 20, 1994

DOCUMENT-IDENTIFIER: US 5375015 A
TITLE: Heat resisting reflection mirror

BSPR:
Where the body material of this kind of reflection mirror is made of metal, such as aluminum with high purity, the conventional electrolytic polishing method consists in forming the reflection mirror body into a desired shape; smoothing the surface by buffing; degreasing it with an alkaline solution; glossing the surface with the electrolytic polishing; and forming an electrode oxide film to seal pores. In a case where the body material of the reflection mirror is made of other than aluminum, the polishing method consists in baking the metal surface with a polyimide heat resistant paint, forming a smooth, glossy aluminum coating of high purity over the heat resistant paint, and then vacuum-vaporizing a glassy protective film of silicon oxide to the thickness of 0.1-0.5 micron. In a case where the body of the reflection mirror uses a glass as the heat ray transmitting material, the polishing method performs a dry coating of a visible-ray-reflecting and heat-ray-transmitting material over the inner surface of the glass. Further in a case where the reflection mirror body is formed of a resin material, a heat resistant paint is coated over the surface of the resin body, followed by another coating of an aluminum film of high purity. The aluminum film is then deposited with a glassy protective film by vacuum evaporation.

CCXR:
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L1: Entry 13 of 18 File: USPT Aug 24, 1993

DOCUMENT-IDENTIFIER: US 5239226 A
TITLE: Replaceable lamp assembly for automotive headlamps

DEPR:
FIG. 3 is a perspective view, in partial cut-away form, of a replaceable lamp assembly of the present invention. Turning to FIG. 3, incandescent-halogen lamp 10 is shown clamped in metal lamp holder 20, a portion of which extends into and is secured in cavity 52 of plastic base 50. In this embodiment, four ribs 53 are molded into the interior surface of cavity 52 extending longitudinally therein of which only two are shown. These ribs aid in positioning the lamp/holder subassembly in the cavity prior to lamp alignment. Sufficient clearance is provided between the locating ribs and lamp holder 20 to allow the necessary amount of radial alignment of the lamp filament before securing the lamp/holder subassembly to the inside envelope of cavity 52. Lamp 10 is an incandescent-halogen lamp which comprises a vitreous outer envelope 12 enclosing within a pair of tungsten filaments 14 and 16 for high and low beam supported by molybdenum lead wires 17, 18 and 19 which pass through the hermetic press seal 11 at the bottom of the lamp where they are connected to one end of terminal pins 60, 61 and 62. Envelope 12 also contains an inert gas, a getter such as phosphorus, hydrogen and at least one halogen within as is well known to those skilled in the art. Light opaque coating 13 on top of lamp 10 insures that all of the visible light emitted is projected forward by the reflector into which the assembly is inserted. Coating 13 is typically a black, heat resistant coating. The lamp is filled and exhausted through a fill-exhaust tube 15 which passes through pinch seal 11 and is tipped off and sealed. Alternatively, the lamp envelope could be filled and exhausted through the top of the lamp as is well known to those skilled in the art. Base 50 is similar to the prior art base 102 shown in FIG. 1. Thus, base 50 contains flange portion 56 and silicone rubber O-ring 58. In use, the replaceable lamp assembly is inserted into the rear of a plastic automotive headlamp reflector 90 as shown in FIG. 4, with flange 56 serving to position lamp 10 within the reflector at the proper focal point. O-ring 58 serves to hermetically seal the replaceable lamp assembly in the rearwardly protruding nose portion 92 of plastic automotive reflector 90. After the lamp assembly has been inserted into and locked in the automotive reflector, an electrical connecting plug similar to plug 110 shown in FIG. 1 is inserted into cavity 54 of base 50 in order to make electrical connection with the lamp via terminal pins 60, 61 and 62.

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L1: Entry 12 of 18 File: USPT Oct 4, 1994

DOCUMENT-IDENTIFIER: US 5353210 A
TITLE: Reflector lamp with low UV emission

DEPR:
Coatings and materials which absorb UV radiation, but which transmit visible light radiation are also known to those skilled in the art and in the practice of the present invention may include those commercially available and obtained from coating manufacturers and suppliers such as the Silicone Division (GE Silicones) of GE Plastics in Waterford, N.Y., Dow Corning, DuPont, Bee Chemical Company and the like. Heat-resistant coatings are preferred for use in the present invention, and illustrative but non-limiting examples of both coatings and UV absorbers based on heat-resistant silicone compounds suitable for use in the present invention are disclosed and claimed, for example in U.S. Pat. Nos. 4,374,674; 4,278,804; 3,986,997; etc., the disclosures of which are incorporated herein by reference. Another UV-absorbent coating material suitable for use in the present invention is zinc oxide (ZnO) and is disclosed in U.S. Pat. No. 4,006,378, the disclosures of which are also incorporated herein by reference. Zinc oxide may also be employed as a pigment material in an ordinary coating or in a higher temperature resistant silicone coating alone, or combined with titanium dioxide, depending upon the application. Such a coating material is disclosed in U.S. Pat. No. 5,051,650, the disclosure of which is incorporated herein by reference. In yet another embodiment, the visible light reflecting coating or film applied to the outer surface of the reflector may be a coating which, in addition to reflecting visible light, also inherently absorbs UV radiation, such as some types (i.e., titania-silica and tantala-silica) of multi-layer, optical interference coatings.

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